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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/974,511	10/10/2001	Masahiro Kawakami	00447CD/HG	8922

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FRISHAUF, HOLTZ, GOODMAN & CHICK, PC  
767 THIRD AVENUE  
25TH FLOOR  
NEW YORK, NY 10017-2023

EXAMINER
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ANDREWS, MELVYN J

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 03/06/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/974,511

Applicant(s)

KAWAKAMI ET AL.

Examiner

Melvyn J. Andrews

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 24-27 and 38-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 24-27 and 38-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☒ Certified copies of the priority documents have been received in Application No. 09/598,605.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5. 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 24 to 27, 38, and 41 to 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satchell Jr (US 5,938,815). Satchell Jr discloses an iron refining method comprising feeding an iron ore feed, a carbon containing substance and an oxygen containing gas into a secondary reactor to form hot solids containing char and partly reduced iron ore, separating gas from the products to form an intermediate feed which is introduced into a primary reactor which is a melt-gasifier into which high purity oxygen is introduced as feed 14 (col. 3, lines 1 to 39) to produce iron 18 but does not explicitly disclose that the high-purity oxygen feed 14 may be a gas containing 20% or more of oxygen but it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the oxygen concentration since it is a result effective variable as evidenced by Satchell Jr which discloses that oxygen-enriched air or even high purity oxygen as feed (col.3, lines 1 to 7) In re Boesch 205 USPQ 215.

The patent to Satchell Jr does not explicitly disclose devolatilizing the carbonaceous until it has a volatile content of less than 10 weight % but Satchell Jr explicitly discloses that "the volatile content of the coal is preferentially decreased" and since the temperature range in the secondary reactor operation is preferably in a range of between about 400°C and about 1200°C (col. 4, lines 36 to 38) results in coal char (col.3, lines 12 to 18) suitable for smelting it would have been obvious to one of ordinary

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skill in the art at the time the invention was made to expect that the Satchell Jr. coal char would contain a "volatile content" equivalent to the claimed "volatile content of less than 10 weight % " as claimed in Claim 24 step (b).

With respect to Claim 46 the Satchell Jr temperature of "about 1200°C" suggests the claimed temperature of 1250°C since the Satchell Jr coal is treated to decrease the volatile content of the coal (col.3, lines 9 to 19) for use in a primary reactor to produce iron.

With respect to Claim 48 Satchell Jr discloses that oxygen enriched air or high purity oxygen 14 as a feed into the primary reactor 10 to produce an off gas stream 16 it would have been obvious to one of ordinary skill in the art at the time the invention was made to expect that post combustion occurred in the primary reactor 10 since an off gas 16 is produced by combustion

Claims 27 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satchell Jr as applied to claim 24 above, and further in view of the Japanese patent No.6-271919. Satchell Jr does not disclose a rotary kiln as a secondary reactor for reducing iron ore but the Japanese patent discloses an iron-making process comprising a process for pre-reducing ore with coal in a rotary kiln to produce a mixed product which is charged into a smelting furnace it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a rotary kiln as a secondary reactor since it is suitable to pre-reduce ore and to produce char as used in the Satchell Jr. primary reactor.

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Claims 27 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satchell Jr as applied to claim 24 above, and further in view of Kundrat (US 5,567,224). Satchell Jr does not disclose a rotary hearth furnace as a secondary reactor but Kundrat disclose a process in which ore mixed with pulverized reductant is fed to a rotary hearth furnace 14 for at least partial metallization, the metal being used as feed material into a refining vessel such as a converter 18 (col.7, lines 24 to 47) it would have been obvious to one of ordinary skill in the art at the time the invention was made to carry out the Satchell Jr pre-reduction in a rotary hearth furnace since Kundrat discloses that a RHF is suitable for at least partial metallization.

Applicant's arguments filed December 18, 2002 have been fully considered but they are not persuasive. Applicants argues that the Fig 7 shows that the post combustion ratio can be operated without so much inviting a heat loss and it is possible to lower net coal, net oxygen and cost of equipment see page 5 and on page 6 states none of the references teach or suggest the heat load of the furnace wall within the smelting reduction furnace can be lowered and the pos combustion ratio can be increased but these features are not clearly claimed.

Claims 24 to 27, 38 to 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meissner et al (US 5,730,775) in view of Kaneko et al (US 4,701,214) and Sarma et al (US 6,171,364). Meissner et al discloses a method for the rapid reduction of iron oxide from compacts composed of iron oxide and carbonaceous

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materials and containing volatile materials in a rotary hearth furnace comprising removing **all** of the volatile materials by exposing the compacts to a radiant heat source (col.7, line 61 to col.8, line 16) but does not explicitly disclose a step of "devolatizing the carbonaceous material until a devolatized carbonaceous material having a volatile content of less than 10 weight % is obtained" but the Meissner et al product which has all the volatile materials removed obviously is within the claimed range a "volatile content of less than 10 weight %", Meissner et al does disclose not explicitly disclose the step of controlling a post combustion rate within a smelting furnace as in Claim 48 but Kaneko et al discloses a rotary hearth furnace in combination with a smelting reduction vessel with a port 60 for the purpose of post combustion (col.3, line 32 to 35) and Sarma et al discloses the formula for calculation of PCD (col.7, lines 47 to 59) which would have been obvious to one of ordinary skill in the art at the time the invention was made to control the post combustion in a melter or a smelting furnace for producing molten iron from partially reduced iron ore.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 24 and 48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 24 recites the limitation "iron" in line 14. There is insufficient antecedent basis for this limitation in the claim.

Claim 48 recites the limitation "post combustion" in line 2. There is insufficient antecedent basis for this limitation in the claim.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melvyn J. Andrews whose telephone number is 703-308-3739. The examiner can normally be reached on 8:00A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for

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the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

mja  
March 4, 2003



**MELVYN ANDREWS**  
PRIMARY EXAMINER